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ABSTRACT

The analytical capabilities of ONPASS, an on-line computer-aided school facility planning system, are described by its developers. This report describes how, using the Canoga Park-Winnetka-Woodland Hills Planning Area as a test case, the Department of City Planning of the city of Los Angeles employed ONPASS to demonstrate how an on-line system can help school planners make optimum use of their facilities. A simulated student data base was estimated for two time periods from the 1970 Census data. Sample data from the Los Angeles study are included in this description of ONPASS. (EMH/PF)

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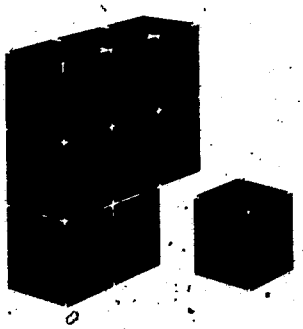

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Computer-Assisted School Facility Planning with ONPASS

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INTRODUCTION

This report describes the analytical capabilities of ONPASS, an online computer-aided school facility planning system developed by Urban Decision Systems, Inc. Using the Canoga Park-Winnetka-Woodland Hills Planning Area in Los Angeles as a test case, ONPASS was selected to demonstrate how an online system can help school planners make optimum use of their facilities.

Under the direction of the Department of City Planning of the City of Los Angeles, this project used a simulated student data base which was estimated for two time periods from 1970 Census data. The schools are existing public elementary schools in the planning area, but the capacities were modified to correspond to student loads in the first time period. ONPASS is currently in use by the Cupertino Union School District, the Newport-Mesa Unified School District, and the Grossmont Union High School District. The ONPASS approach grew out of a procedure developed for the Santa Monica Unified School District in 1971.

ONPASS is a proprietary software product of Urban Decision Systems, Inc.

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SECTION ONE

AN INTERACTIVE PLANNING TOOL

ONPASS -- short for Online Pupil Assignment System -- uses a machine-readable student data base to help achieve optimum facility utilization in the design of school attendance areas. In the process, it seeks to lower transportation costs by keeping the distance travelled to school as short as possible.

Once the assignment process has been completed, ONPASS can produce a variety of summary and detail reports, as well as computer plots, for exhaustive evaluation of the assignment plan and its resulting transportation requirements.

More than an interactive planning system, ONPASS is an interactive planning tool. It is not to be confused with a theoretical model; rather, it is a practical, workable, and economical procedure for performing a difficult job.

In the following presentation of ONPASS and its capabilities, ask yourself the following questions:

Can you as a planner readily comprehend what the ONPASS procedure does?

Can you integrate the procedure into your existing decision-making process?

Does the procedure improve the quality and integrity of your decision-making process?

Is the procedure a reasonable economic alternative to your existing manual process?

THE LOGIC BEHIND ONPASS

ONPASS is designed to perform a specific planning task -- namely, the assignment of students to existing or proposed school facilities and the analysis of the resulting transportation needs. To accomplish this, the ONPASS procedure uses the same information and the same basic logic as the manual process.

There is nothing obscure or hidden about the assignment logic used in ONPASS. At the heart of ONPASS is an algorithm that simultaneously assigns students to all the schools in the district. Given a set of planner-imposed constraints, a student goes to the closest school with the capacity to accommodate him. These constraints may include maximum distance to be travelled, street crossing hazards, manual preassignment of specific planning areas, and adjustments to the capacities of the schools.

The benefit to you resides in the speed at which ONPASS can generate a comprehensive assigment plan,,allow you to fully analyze the plan and then to modify any of the parameters and rerun the assignment.

In a single run of ONPASS, you do not come up with the optimal solution. What you do get is a deeper understanding of the problem, more information about an acceptable solution, and more questions which can be rapidly answered by the procedure. This is what is meant by interaction. ONPASS allows you to enter into a dialog with your data base. It helps you see the present more clearly and gives you a framework for asking those "what if" questions about the future.

DATA INPUTS TO ONPASS

ONPASS requires several data files to be used in the pupil assignment process. The information in these data files is no different than the information on a spotting map as currently used by most districts in reviewing school attendance areas.

To put information into a machine-readable data file, however, requires that well-planned collection, validation, and update procedures be implemented. Once you have created a reliable data base and provided for its maintenance, you will be able to respond quickly to changes in the student body or school facilities.

The data inputs to ONPASS can be broken down into three categories:

- Student counts by planning units.
- School facilities by location and capacity.
- Geographic connectivity.

Student Counts

ONPASS does not assign individual students to schools. Rather, small units of geography known as planning units are assigned to a school's attendance area. A planning unit can consist of a single street segment, a city block, or any combination of these. The smaller the planning unit, the finer the level of analysis -- but the greater the number of planning units to be reckoned with.

Conceptually, the planning unit is a homogeneous micro-neighborhood, all of which would be logically reassigned to a school if any part of it were.

The records in the student data file consist of five fields each, as in the following excerpt:

1	421	49	11	9
2	418	49	11	10
3	414	49	10	8
4	411	49	5	5
5	403	49	39	73
6	403	57	28	24
7	411	57	8	7
8	414	57	7	5
9	418	58	8	7
10	421	57	14	12

The first column contains a planning unit code, followed by horizontal and vertical displacements in hundreds of feet from a reference point at the northeast extremity of the district to the centroid of the planning unit. The remaining two columns contain the count of elementary school students in 1975 and (projected) 1980.

The specific student counts you supply depend on the level of detail at which you wish to perform your analysis. If the data file includes counts by grade levels, then selected grade level combinations can be treated independently in the planning process.

Usually, this student file is generated by address-matching a machine-readable administrative student record file to the street segments in a Geographic Base File (GBF). Under these circumstances, the individual students can be accumulated into planning units that have been defined as some combination of GBF street segments. Each planning unit is assigned a unique identifier in numeric sequence and is referred to by that identifier throughout the ONPASS process.

School Facilities — The school facilities file input to ONPASS can consist of a single value representing the total student capacity, or it can be segmented into grade levels such as kindergarten and grades 1-6. Below is a portion of the school facilities file used for the Canoga Park-Winnetka-Woodland Hills Planning Area:

01	CALABASH	914	690	690
02	CALVERT	675	660	660
03	CANOGAPK	343	1260	1260
04	CAPISTRA	128	1260	1260
05	COLLINS	720	720	720
06	ENADIA	245	1200	1200
07	FULLBRIG	436	990	990
08	HAMLIN	550	960	960
09	HARTSTR	363	870	870
10	HAYNES	634	1410	1410

The five columns represent the unique school identifier, an 8-character abbreviation of the school's name, the planning unit in which the school is located, the 1975 school capacity, and the projected 1980 school capacity.

Note that you can distinguish between portable and permanent classroom capacities in your school file. This makes it easier for you to determine at a glance whether you can alleviate a shortage of classroom space at one school by moving in unneeded portable classrooms from another.

Geographic Connectivity — In order to assign the students in a planning unit to the nearest school, ONPASS requires a file that spatially relates the planning units to the schools. The records in the geographic connectivity file define a link from one planning unit to another. One such link record exists for each pair of physically adjacent planning units the distance between which the student can walk. This connectivity can be by distance in feet or miles, or by travel time in minutes.

The distance or time value can be as accurate as you want it to be. It can be estimated as the straight line distance or time between the centroids of the two planning units, or it can be the actual distance or time over the street network using the shortest route. This data allows ONPASS to determine the set of planning units that can be reached directly from any other planning unit and the cost of so doing in terms of distance or travel time.

Below is an excerpt from such a geographic connectivity file:

6	13	8
7	8	2
7	11	13
8	11	10
8	9	3
9	11	9
9	10	3
10	11	13
11	12	7
11	13	12

The first and second columns contain the codes of the adjacent planning unit pairs, and the third column is the distance between the planning unit centroids in hundreds of feet.

Other Inputs — These are the three basic data files used by ONPASS. In actual planning situations, any number of files of each type can be generated to reflect future expectations. A second student file, for instance, can be generated that contains anticipated student populations and can be used to review the adequacy of existing attendance areas in the future.

PLANNING INPUTS

Given the basic data inputs to ONPASS, you can begin to vary certain parameters to test various policy constraints and hypothetical situations. You can, among other things:

- Change transportation parameters to determine the cost effects of different school bus transportation criteria;
- Selectively add (or subtract) population to areas to determine any possible effect on existing school loads;
- Measure the effect of building, adding to, or closing schools and determine what the effect would be on attendance areas throughout the district; and
- Preassign specific planning units to a school to ensure that they are included in a particular attendance area.

You can even measure the effect of putting up a pedestrian bridge over a freeway by adding a record to the geographic connectivity file establishing a link between two planning units.

SECTION TWO

ONPASS AT WORK

The ONPASS interaction shown in this section uses as input three data files developed for the Canoga Park-Winnetka-Woodland Hills Planning Area in Los Angeles. The planning units in this area are made up of 1970 Census blocks. To derive a count of students per planning unit as of 1975, the City of Los Angeles used 1970 Census data. A second set of student counts by planning unit was generated to reflect expectations for 1980.

Although the schools used in this study are actual facilities, their capacities were altered to accommodate the 1975 census-derived student loads within existing attendance areas. The estimated road distances between adjacent planning unit centroids was measured in hundreds of feet.

In this study, the planning area and its schools are real, but the student counts and measured distances represent estimates.

Figure 1 on page 9 includes a flowchart that summarizes the process shown in the typical terminal session that follows. Highlighted are user interaction, report and map outputs, and ONPASS's unique capabilities for answering "what if" questions instantly. The running commentary accompanying the interaction develops the user's line of thought as he runs ONPASS and explains the outputs.

The terminal session proceeds from an evaluation of existing facility utilization and transportation needs to what is anticipated for 1980, at which point our planner begins asking some hypothetical questions concerning changes in the schools' capacities.

On the left-hand pages will be found the explanatory comments for the terminal session appearing on the right-hand pages. The commands typed by the planner appear in lower case, while ONPASS responses are in upper case. To help you understand the interaction, all commands were typed in full. Each command and keyword parameter can be abbreviated to speed up the interaction. For example, the command:

list areas assigned school 17

can be abbreviated as:

li ar as sch 17

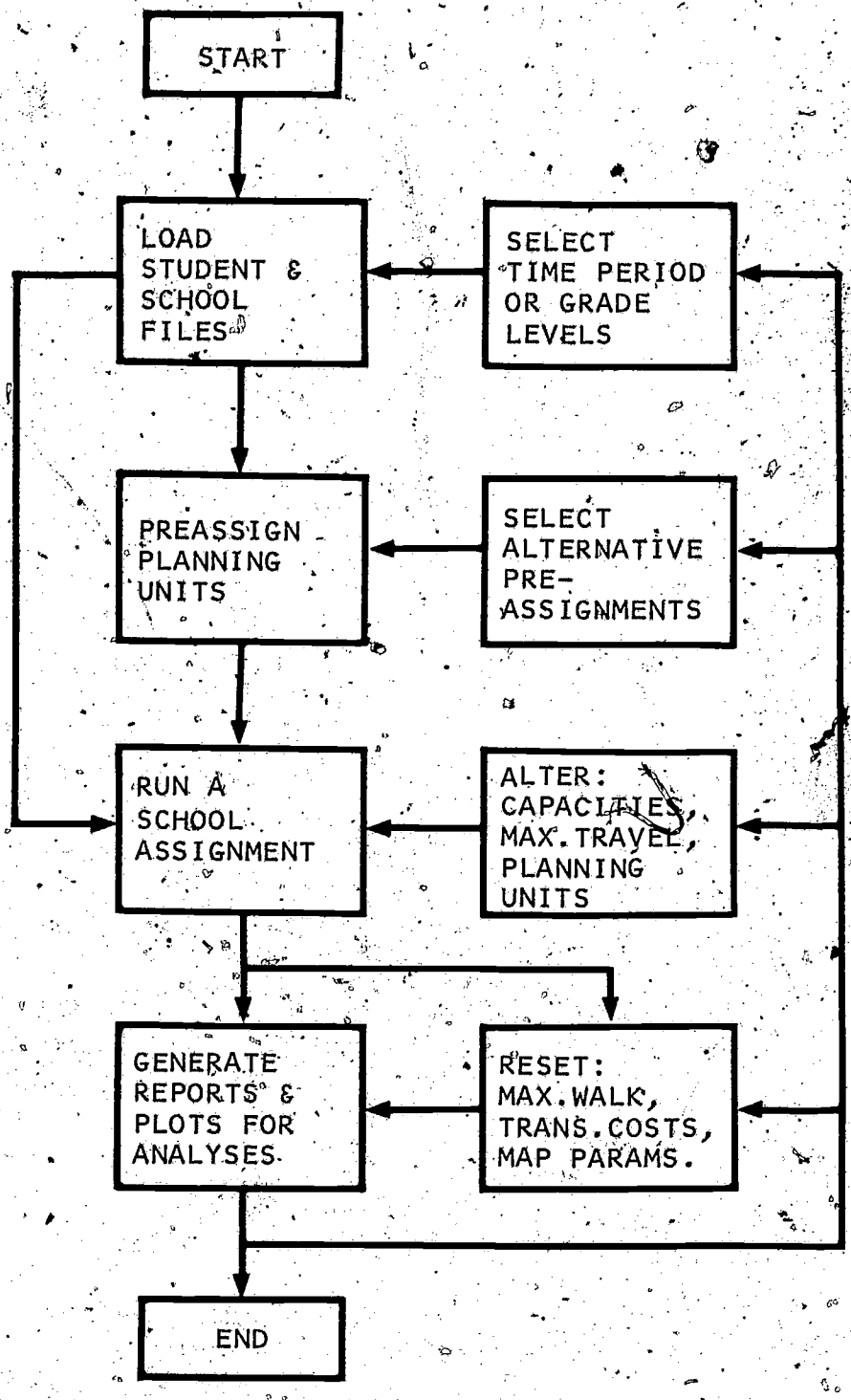


Figure 1: The Facility Planning Process with ONPASS

(1) The user enters the ONPASS environment by issuing the ONPASS command and types the LOAD command to activate the input data files for the current school year. In response, ONPASS provides a general overview of the school district. Here it shows that the district includes 23 schools with a combined capacity of 21,330 students. There are actually 20,640 students in the 1114 planning units.

(2) In order to generate baseline measures of utilization, average distance, and transport costs, the existing school attendance areas are imposed on the district by reading in a preassignment file that associates each planning unit with a specific school.

(3) With the execution of the ASSIGN command, student loads at the schools are calculated along with the shortest path from each planning unit to its assigned school. The response indicates the district-wide averages for level of school facility utilization and distance to school. These figures represent standards against which to measure an individual school's performance.

(4) The same figures can be obtained for each school in the district by issuing the REPORT ASSIGNMENTS command. The report on the next page shows that existing school facilities are well utilized.

Note that seven of the schools in the district (1, 3, 6, 7, 17, 18, and 22) have both a relatively large number of students and greater average distance to school. We can expect that a large percent of the district's transportation costs will be associated with these schools.

School 11 (Highland) is so small that one might question its efficiency. On the other hand, School 10 (Haynes) is extremely large owing to portable classrooms that had been added a year earlier to accommodate the growing student population.

(1) 08.07.55 onpass
ONPASS.1 08/05/75:
load schools (cp75) lacp
LOADING SCHOOLS FROM LACP
SCHOOLS LOADED:
 23 SCHOOLS, CAPACITY 21330
load areas (dm75) lacp
LOADING AREAS FROM LACP
LOADING LINKS FROM LACP
AREAS LOADED:
1114 AREAS, 2531 LINKS, DEMAND 20640

(2) do lacpass
PROCESSING: LACPASS

(3) assign

ONPASS ASSIGNMENT: 08.10.28 08/12/75
SCHOOLS 23, CAPACITY 21330, UTILIZATION 96.8%
  STUDENTS ASSIGNED 20640, AV DISTANCE 0.62

(4) report assignments

	SCHOOL	CAPACITY	STUDENTS	UTILIZATION	AV DISTANCE
1	CALABASH	690	669	97.0%	0.85
2	CALVERT	660	598	90.6%	0.61
3	CANOGAPK	1260	1223	97.1%	0.72
4	CAPISTRA	1260	1254	99.5%	0.49
5	COLLINS	720	688	95.6%	0.59
6	ENADIA	1200	1175	97.9%	0.66
7	FULLBRIG	990	964	97.4%	0.70
8	HAMBIN	960	925	96.4%	0.42
9	HARTSTR	870	859	98.7%	0.55
10	HAYNES	1410	1396	99.0%	0.55
11	HIGHLAND	450	323	71.8%	0.32
12	JUSTICS	630	610	96.8%	0.49
13	LOCKHURS	1380	1363	98.8%	0.64
14	OAKDALE	660	647	98.0%	0.40
15	OSO	630	606	96.2%	0.55
16	PLATRAN	630	603	95.7%	0.72
17	POMELO	630	587	93.2%	0.87
18	SERRANIA	1200	1164	97.0%	0.93
19	SUNNYBR	1290	1275	98.8%	0.68
20	WELBYWAY	1140	1109	97.3%	0.45
21	WINNETKA	660	644	97.6%	0.53
22	WOODLAKE	1260	1228	97.5%	0.76
23	WOODLAND	750	730	97.3%	0.72

TOTAL STUDENTS	20640	
ASSIGNED	20640	100.0%
UNASSIGNED	0	0.0%

(5) The OUTPUT PRINTER and SET MAP SCALE commands are preparation for creating a graphic representation of the existing school attendance areas. Because the plot of the attendance areas is scaled to a base map of 1000 feet to the inch and will be produced in 3 strips, the user directs the output to a high-speed printer. He also sets the map scale, page width, and number of coordinate units to the mile to ensure that the plot will overlay his base map.

(6) The MAP command allows you to plot -- at the planning unit level -- assignment to schools, distance from school, and number of students. You can display one or two variables at a time at any scale. You can also restrict the plot to a specific portion of the district by specifying the portion you want to see. Plot 1 in the Appendix is the plot of planning units by school generated by the MAP ASSIGNMENTS command on the opposite page.

(7) Before continuing, the user sets the transport ride parameter (SET TRANSPORT RIDE) to one mile, specifying that students in planning units farther than a mile from their school are designated as bus riders. So that subsequent outputs are routed to his terminal, he issues an OUTPUT TERMINAL command.

(8) For a detailed look at the planning units assigned to a specific school, the user issues a LIST AREAS command for school 17 (Pomelo).

Once ONPASS has made an assignment, it knows the distance from each planning unit to its assigned school. This information allows the system to calculate the transportation requirements and estimate their cost. You supply all the cost estimate parameters. One of these parameters, the distance beyond which students are transported, was supplied above in the SET TRANSPORT RIDE command to reflect the district's policy on supplying transportation.

(5) output printer
OUTPUT ON PRINTER

set map scale 5.28 page 126 metric 49
MAP PARAMETERS:
SCALE 5.28 INCHES/MILE, METRIC 49 UNITS/MILE, PAGE WIDTH 126 COLS

(6) map assignments

(See Plot 1 in the Appendix for output)

(7) set transport ride 1.0
TRANSPORT PARAMETERS:
WALK 1.0 MILES, BUS.UNIT 66
COST $ 0./UNIT-YEAR, $ 70.00/MILE-YEAR
output terminal
OUTPUT ON TERMINAL

(8) list areas assigned schools 17

SCHOOL/AREA	STUDENTS	DISTANCE	MODE	CUM.STUD.	
17 POMELO	587				
268	226	0.0		226	38.5
227	0	0.3		226	38.5
276	0	0.3		226	38.5
269	0	0.6		226	38.5
270	0	0.8		226	38.5
229	0	0.8		226	38.5
271	0	0.8		226	38.5
272	0	0.9		226	38.5
253	32	0.9		258	44.0
273	0	1.0		258	44.0
255	5	1.1	RIDE	263	44.8
254	6	1.1	RIDE	269	45.8
256	38	1.1	RIDE	307	52.3
216	0	1.2	RIDE	307	52.3
228	0	1.3	RIDE	307	52.3
230	0	1.4	RIDE	307	52.3
252	25	1.4	RIDE	332	56.6
258	161	1.5	RIDE	493	84.0
251	21	1.5	RIDE	514	87.6
249	18	1.6	RIDE	532	90.6
250	14	1.6	RIDE	546	93.0
215	12	1.6	RIDE	558	95.1
248	29	2.0	RIDE	587	100.0

(9) The other parameters convert the transportation requirement into dollars. Two cost factors can be applied: a fixed cost per vehicle per year and a yearly cost per vehicle per bus route mile. In this run, the user supplies only a variable cost of $75.00 per mile per year (SET TRANSPORT COST).

(10) The transportation report summarizes the transport costs for the schools in the district applying the costing parameters previously supplied by the user. Keep in mind that the cost figures used here are hypothetical and would have to be determined empirically for each school district. Note that the observation made earlier that schools 1, 3, 6, 7, 17, 18 and 22 would account for most of the transportation costs turned out to be correct.

(11) Additional information on transportation is generated in a graphic form using the MAP TRANSPORT function. Included are the planning unit number and student population of each planning unit whose students are to be bussed to their assigned school. Values are superimposed over the centroid of each unit. The MAP TRANSPORT command can be specific to one school (as shown here) or can cover the entire district. This plot is particularly useful in establishing bus routes.

(9) set transport cost 0.0 75.0
TRANSPORT PARAMETERS:
WALK 1.0 MILES, BUS.UNIT 66
COST $ 0./UNIT-YEAR, $ 75.00/MILE-YEAR

(10) report transport

SCHOOL	STUDENTS TOTAL	WALK	%	RIDE	%	AV DISTANCE WALK	RIDE	TRANSPORT COST
1 CALABASH	669	446	66.7	223	33.3	0.68	1.19	$ 19800
2 CALVERT	598	471	78.8	127	21.2	0.44	1.21	$ 15825
3 CANOGAPK	1223	1005	82.2	218	17.8	0.61	1.19	$ 20475
4 CAPISTRA	1254	1187	94.7	67	5.3	0.44	1.31	$ 5175
5 COLLINS	688	607	88.2	81	11.8	0.51	1.14	$ 10500
6 ENADIA	1175	904	76.9	271	23.1	0.51	1.14	$ 27825
7 FULLBRIG	964	698	72.4	266	27.6	0.45	1.31	$ 31425
8 HAMLIN	925	925	100.0	0	0.0	0.42	0.0	$ 0
9 HARTSTR	843	804	95.4	39	4.6	0.51	1.27	$ 5700
10 HAYNES	1396	1125	80.6	271	19.4	0.38	1.23	$ 12375
11 HIGHLAND	323	323	100.0	0	0.0	0.32	0.0	$ 0
12 JUSTICS	610	580	95.1	30	4.9	0.45	1.15	$ 4575
13 LOCKHURS	1358	1098	80.9	260	19.1	0.51	1.21	$ 19050
14 OAKDALE	647	647	100.0	0	0.0	0.40	0.0	$ 0
15 OSO	606	572	94.4	34	5.6	0.47	1.76	$ 8925
16 PLATRAN	603	453	75.1	150	24.9	0.55	1.25	$ 15225
17 POMELO	587	258	44.0	329	56.0	0.11	1.46	$ 31425
18 SERRANIA	1164	663	57.0	501	43.0	0.53	1.44	$ 49200
19 SUNNYBR	1275	1149	90.1	126	9.9	0.62	1.12	$ 14175
20 WELBYWAY	1109	1096	98.8	13	1.2	0.45	1.15	$ 4575
21 WINNETKA	644	569	88.4	75	11.6	0.47	1.04	$ 8475
22 WOODLAKE	1228	904	73.6	324	26.4	0.57	1.29	$ 31050
23 WOODLAND	730	594	81.4	136	18.6	0.55	1.46	$ 19125
TOTAL	20619	17078	82.8	3541	17.2	0.49	1.29	$ 354900

output printer
OUTPUT ON PRINTER

(11) map transport schools 17

(See Plot 2 in the Appendix for output)

(12) To determine how the present attendance areas measure up to the ideal neighborhood school attendance areas, the user runs the assignment function without preassignments and irrespective of school capacities. This run assigns each planning unit to the nearest school without respect to constraints, thus providing the minimum transportation cost for the district.

(13) It appears that the slightly lower average distance (0.57 miles per student as opposed to 0.62 miles with preassignments) means that the current attendance areas have been well-defined. The additional 0.05 miles per student, however, translates to an additional 1032 student miles per day with a student body of 20,640.

(14) Now the user is ready to start asking some "what if" questions. The first is: What happens in 1980 with the same attendance areas but with a different student population distribution? To answer this, the area file is reloaded with 1980 projections along with the 1975 attendance areas, and the assignment is rerun. From the summary statistics, you can see that the district-wide student population has declined by 2345.

(15) The assignment report indicates that this decline is not evenly distributed throughout the district. In fact, several areas increase in population. Most schools experience a 12% decrease in capacity utilization, while Highland (11), Pomelo (17), and Winnetka (21) experience substantial increases, thus driving their student loads well above current capacities.

(12) assign nocap

(13) ONPASS ASSIGNMENT: 08.30.53 08/12/75
SCHOOLS 23, CAPACITY 21330, UTILIZATION 96.8%
STUDENTS ASSIGNED 20640, AV DISTANCE 0.57

(14) load areas (dm80) lacp
LOADING AREAS FROM LACP
LOADING LINKS FROM LACP
AREAS LOADED:
1114 AREAS, 2531 LINKS, DEMAND 18547
do lacpass
PROCESSING: LACPASS
assign

ONPASS ASSIGNMENT: 08.32.57 08/12/75
SCHOOLS 23, CAPACITY 21330, UTILIZATION 87.0%
STUDENTS ASSIGNED 18547, AV DISTANCE 0.62

(15) report assignments

	SCHOOL	CAPACITY	STUDENTS	UTILIZATION	AV DISTANCE
1	CALABASH	690	573	83.0%	0.85
2	CALVERT	660	515	78.0%	0.61
3	CANOGAPK	1260	1034	82.1%	0.72
4	CAPISTRA	1260	1089	86.4%	0.49
5	COLLINS	720	588	81.7%	0.59
6	ENADIA	1200	1009	84.1%	0.66
7	FULLBRIG	990	829	83.7%	0.70
8	HAMLIN	960	796	82.9%	0.42
9	HARTSTR	870	738	84.8%	0.55
10	HAYNES	1410	1214	86.1%	0.55
11	HIGHLAND	450	606	134.7%	0.32
12	JUSTICS	630	524	83.2%	0.49
13	LOCKHURS	1380	1179	85.4%	0.64
14	OAKDALE	660	558	84.5%	0.40
15	OSO	630	526	83.5%	0.55
16	PLATRAN	630	521	82.7%	0.72
17	POMELO	630	743	117.9%	1.00
18	SERRANIA	1200	989	82.4%	0.91
19	SUNNYBR	1290	1105	85.7%	0.66
20	WELBYWAY	1140	961	84.3%	0.45
21	WINNETKA	660	778	117.9%	0.47
22	WOODLAKE	1260	1059	84.0%	0.76
23	WOODLAND	750	613	81.7%	0.72

TOTAL STUDENTS	18547	
ASSIGNED	18547	100.0%
UNASSIGNED	0	0.0%

(16) As Plot 1 in the Appendix shows, Highland and Pomelo are adjacent schools, both of which are affected by the projected student population growth in the northwest portion of the district. Earlier, the comment was made that Highland had a particularly small capacity. The planner can now think of shifting the portable classrooms from Haynes (10), whose enrollment has declined, to Highland to help alleviate the projected overassignment at the latter and to bring their capacities into line with the other facilities. This is done by loading a modified school file representing the changes in capacity.

(17) At the same time, in order to reduce the student load at Pomelo (17), the user removes the attendance area restrictions on Pomelo and Justics by loading in a new 1980 preassignment file (LACPAS1).

(18) Now when the assignment is rerun, new attendance areas are defined for Pomelo and Justics, and some changes also occur to two neighboring schools -- Enadia (6) and Highland (11). All students are assigned, but both Highland and Pomelo are now within capacity.

(19) A plot of only the northwest portion of the district highlights the change in attendance areas when compared to Plot 1.

This sample ONPASS terminal session stops here. A school planner, however, can go much further. He can go on to look at the transportation costs, generate a detailed list of planning units now assigned to the five affected schools, create bus routes and schedules, or continue the "what if" questions on other possible changes in the district.

```
(16) load schools (cp80) lacp
LOADING SCHOOLS FROM LACP
SCHOOLS LOADED:
 23 SCHOOLS, CAPACITY - 21330
list schools 10 11
     SCHOOL   AREA STREET CAPACITY
 10 HAYNES     634      0     1230
 11 HIGHLAND   259      0      630

(17) do lacpas1
PROCESSING: LACPAS1

assign

(18) ONPASS ASSIGNMENT: 08.45.31  08/12/75
SCHOOLS  23, CAPACITY  21330, UTILIZATION   87.0%
    STUDENTS ASSIGNED  18547, AV DISTANCE    0.61

report assignments
     SCHOOL      CAPACITY  STUDENTS  UTILIZATION  AV DISTANCE
  1 CALABASH        690       573       83.0%        0.85
  2 CALVERT         660       515       78.0%        0.61
  3 CANOGAPK       1260      1034       82.1%        0.72
  4 CAPISTRA       1260      1089       86.4%        0.49
  5 COLLINS         720       588       81.7%        0.59
  6 ENADIA         1200      1451      120.9%        0.68
  7 FULLBRIG        990       829       83.7%        0.70
  8 HAMLIN          960       796       82.9%        0.42
  9 HARTSTR         870       738       84.8%        0.55
 10 HAYNES         1230      1214       98.7%        0.55
 11 HIGHLAND        630       607       96.3%        0.32
 12 JUSTICS         630       555       88.1%        0.57
 13 LOCKHURS       1380      1161       84.1%        0.64
 14 OAKDALE         660       558       84.5%        0.40
 15 OSO             630       526       83.5%        0.55
 16 PLATRAN         630       521       82.7%        0.72
 17 POMELO          630       269       42.7%        0.25
 18 SERRANIA       1200       989       82.4%        0.91
 19 SUNNYBR        1290      1105       85.7%        0.66
 20 WELBYWAY       1140       979       85.9%        0.47
 21 WINNETKA        660       778      117.9%        0.47
 22 WOODLAKE       1260      1059       84.0%        0.76
 23 WOODLAND        750       613       81.7%        0.72

TOTAL STUDENTS   18547
      ASSIGNED   18547   100.0%
    UNASSIGNED       0     0.0%

(19) map assignments window 2.8 5.0 1.0 3.2
```

(See Plot 3 in the Appendix for output)

SECTION THREE

COSTS AND BENEFITS

Many of the costs and benefits associated with ONPASS have been discussed in the preceding sections. A brief summary, however, may help bring into focus the level of resource expenditures required by ONPASS and the benefits to be derived from using it.

COSTS

Once a school district has committed itself to an effective school facility master planning process, it has in effect committed itself to a level of resource expenditure equivalent to that required by ONPASS. The cost factors associated with ONPASS fall into into three categories: data base development, personnel, and computer resources.

Data Base Development

The information required in the facility planning process, such as student counts by location, school capacities, and geographic connectivity, must be put into machine-readable data files for ONPASS. The incremental cost associated with this move to machine-readable files depends on the level of detail to be reflected in the planning files and the status of the source files from which the data is being derived.

School districts currently maintaining computerized administrative student files in a metropolitan area covered by a good Geographic Base File (GBF) could, within a month, generate the necessary ONPASS data inputs. On the other hand, districts lacking machine-readable student files and GBFs for their community have farther to go in order to develop ONPASS data files at a comparable level of detail.

With the exception of some consultation on the appropriate data base development procedures, the major costs for this activity are internal resource costs. A school district's clerical and professional staff are quite capable of collecting and coding the necessary data files.

Personnel — ONPASS is designed to be operated by one or more of the district's staff members who are involved in the school facility master planning process. No computer programming experience is required. The only specialized training required would be in the execution of the ONPASS program itself. And this can be accomplished in a single two-day training session.

Computer Resources — ONPASS can operate under IBM's VM/370 timesharing system and National CSS's VP/CSS timesharing system. No computer purchases or leases are required in order to use ONPASS. Leased access to ONPASS is available through one of the timesharing systems mentioned above. This means that the usage fees are directly related to the amount of work being performed by ONPASS.

Leased access to ONPASS costs approximately $550.00 a month, plus computer resource charges. These resource charges are what you pay when you are actually interacting with ONPASS. The ONPASS terminal session shown in Section Two took about 30 minutes to execute and cost approximately $75.00 in computer resources.

BENEFITS

It is always difficult to convert the benefits of using a new capability like ONPASS into dollars and cents when the capability goes far beyond the mere duplication of an existing process. The question to ask yourself is: Can ONPASS improve the quality of decisions such as you are now making without it?

Following are six reasons why we think ONPASS can, in fact, improve the quality of decisions being made in school facility master planning.

Immediate Analysis — Once the input data files have been completed, you can begin analyzing student assignment and transportation needs at once, as they arise, without having to face the delay and costs associated with ad hoc data collection. The result is a more timely solution based on a comprehensive and up-to-date set of data.

Speed — In 30 minutes, the ONPASS terminal session in Section Two did what would have taken a professional staff member two weeks to duplicate manually. ONPASS can analyze dozens of student assignment alternatives in exhaustive detail during a single working day. And the result of the process is not a hodge-podge of meaningless statistics that only an expert can unravel, but a series of reports that can be presented without alteration to the school board or released to the public.

Innovative Solutions — The speed of ONPASS combined with the ability to vary planner inputs from run to run allows the planner to experiment with a variety of alternatives that would have to be left unexplored under the severe time pressure that goes with manual analysis. This experimentation leads to a better understanding of the problem at hand and its interdependencies, resulting in a more permanent and creative set of solutions.

Cost-Effective Solutions — ONPASS allows you to conserve your staff resources and at the same time to select from among a large number of possible solutions the one that leads to the best facility utilization and the lowest transportation costs. The result is a cost-saving solution.

Community Participation — ONPASS focusses the analytic process on specific objectives and their measures of attainment. A standard, easy-to-understand set of statistics is generated for each alternative allowing you to evaluate it quickly and intelligently. This allows you to respond to possible solutions presented by the community with the same speed and thoroughness that you use in your internal evaluation process.

If your district can easily respond to inputs from the community, it will be in a better position to present its

case without prolonged political wrangling. One of the results of using ONPASS can be a greater understanding on the part of the taxpayers of the decision-making process from their actual participation in it.

Integrity

ONPASS uses the same carefully prepared set of data files for analysis of all alternatives. With a basic logic that is straightforward and comprehensive, ONPASS lays bare the advantages and disadvantages of all alternative solutions.

Moreover, you will get the same answer each time you submit any given alternative using the same set of data. When you are doing this type of analysis manually, you can get a different result each time you study the same alternative. ONPASS is not a "black box" that mysteriously gives the right answers using some obscure logic.

Instead, ONPASS is a tool that can be used to give substance to your ideas by rapidly marshalling and correlating the student, school, and geographic information fed into it.

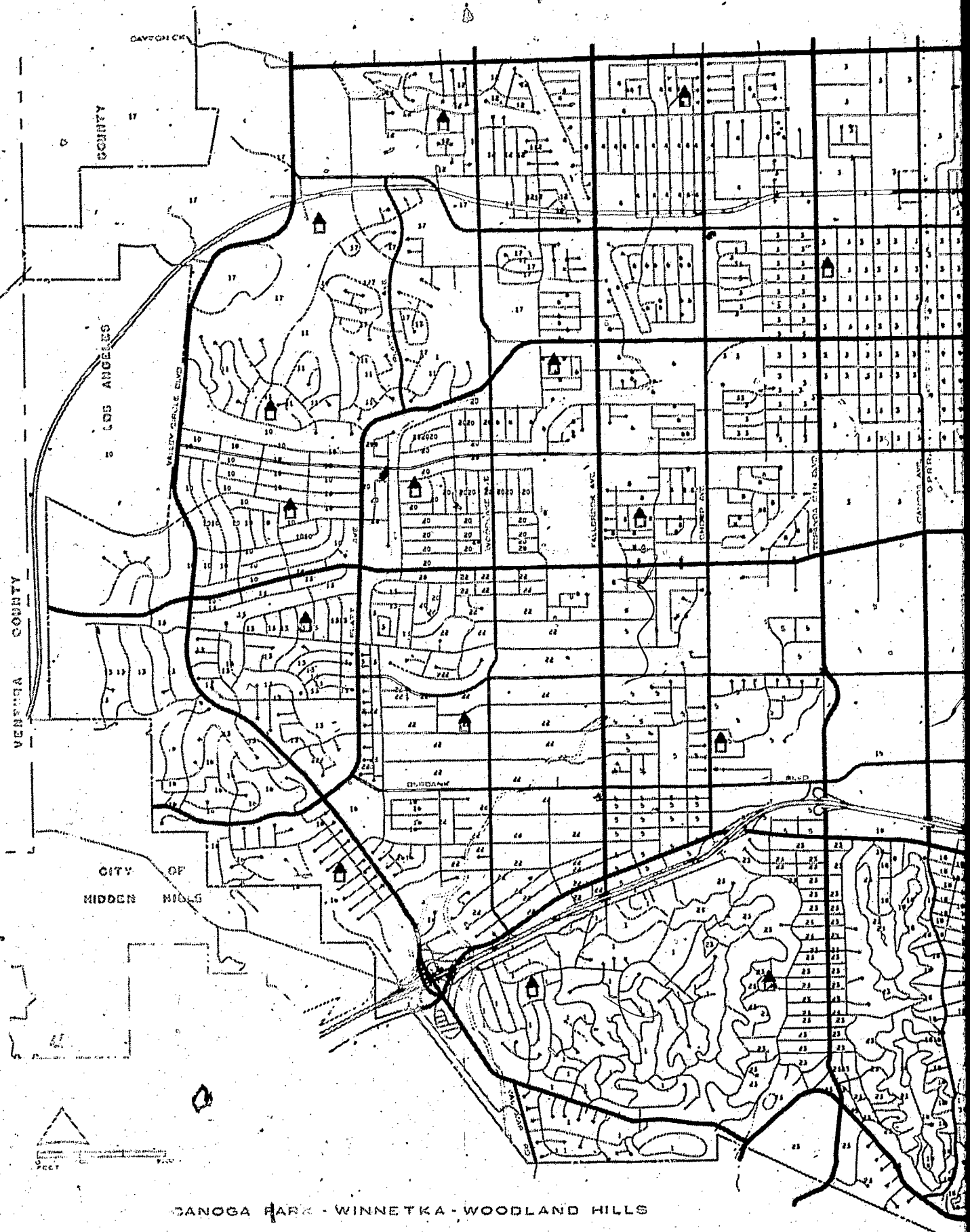
APPENDIX

COMPUTER PLOTS GENERATED BY ONPASS

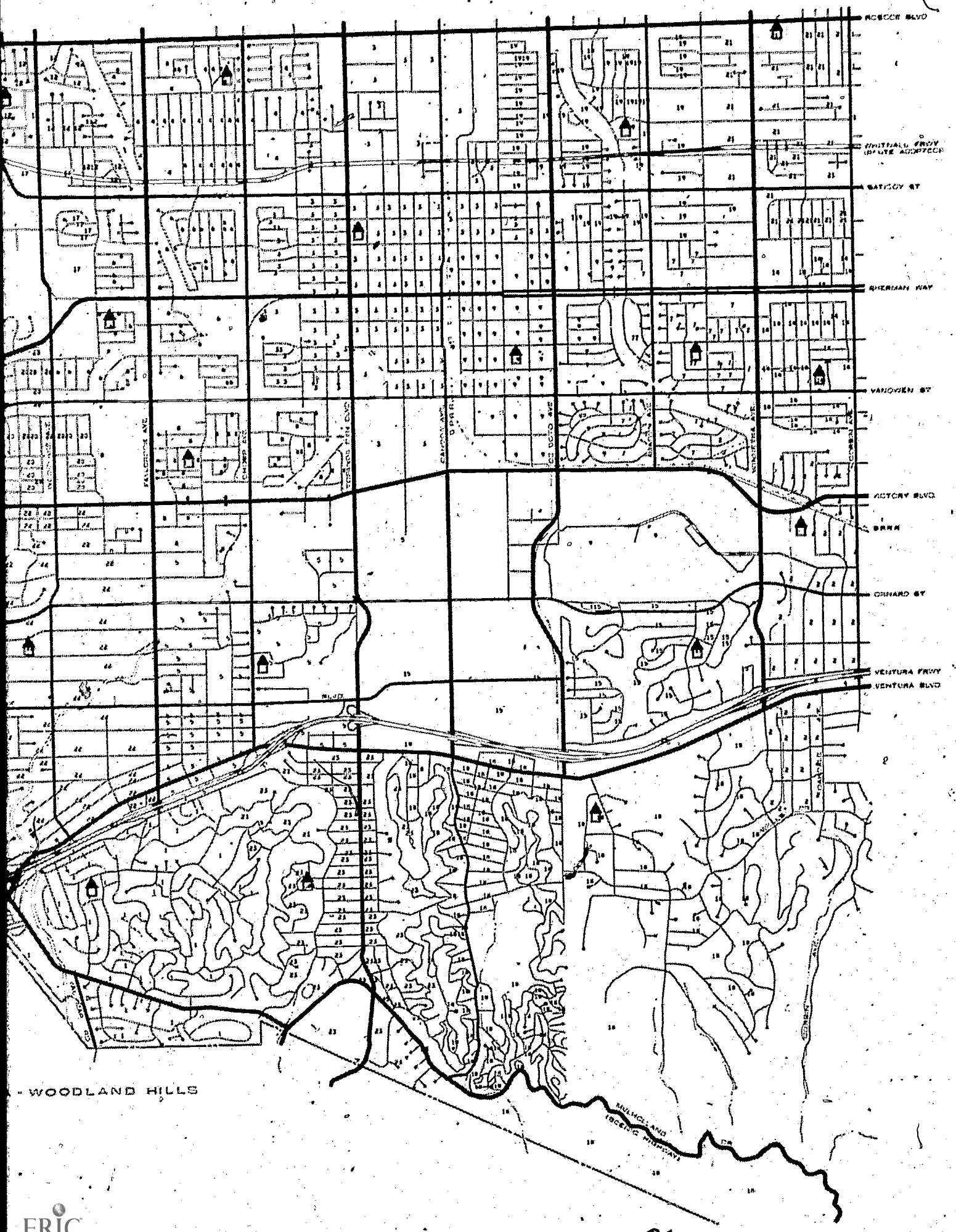
PLOT 1

MAP OF ASSIGNMENTS

This plot of area assignments delineates the school attendance areas by printing the school number at the centroid of the assigned planning units. The plots, when used in conjunction with a base map as in the plot on the facing page, are useful graphic aids in the planning process.



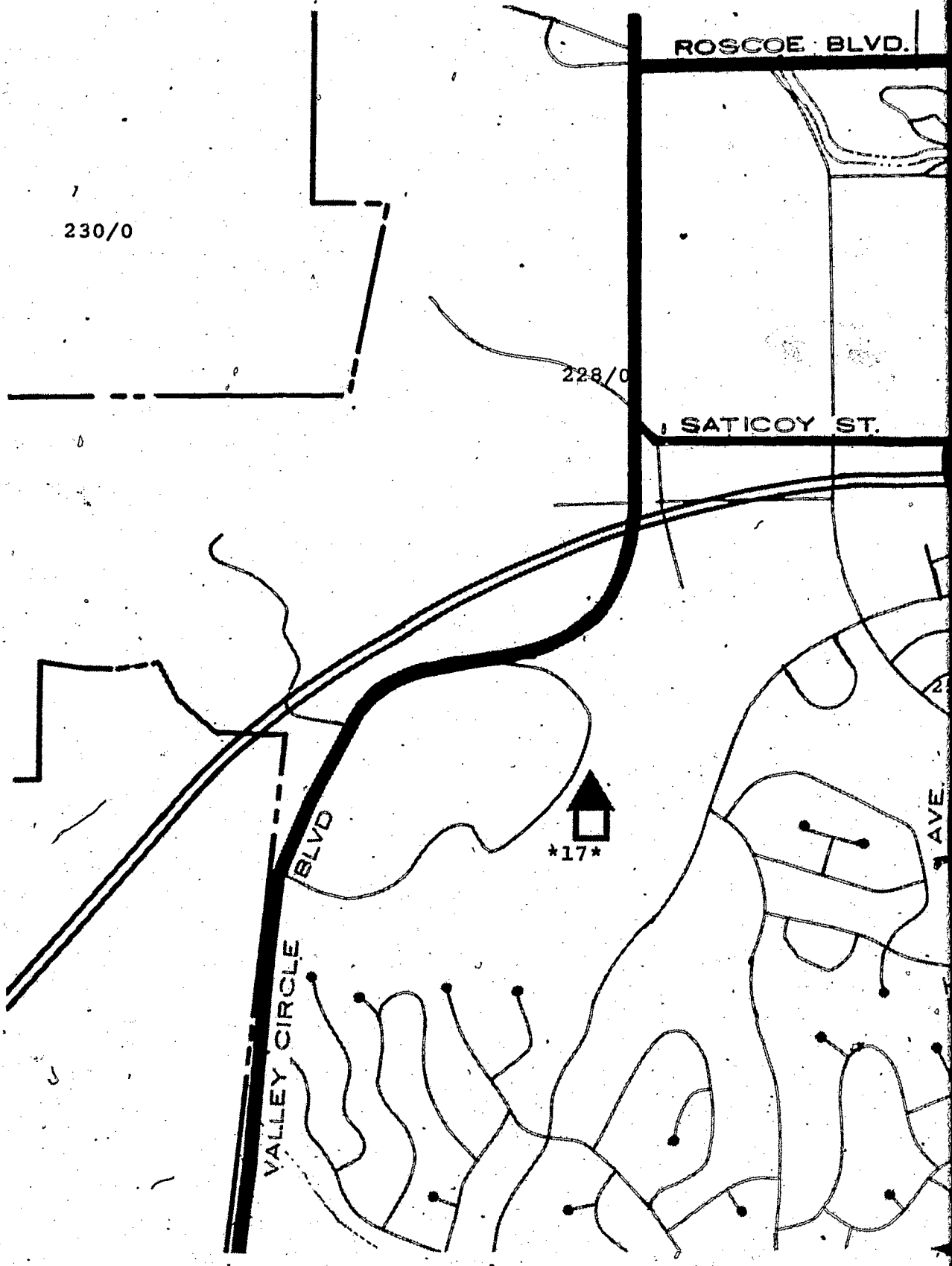
CANOGA PARK - WINNETKA - WOODLAND HILLS

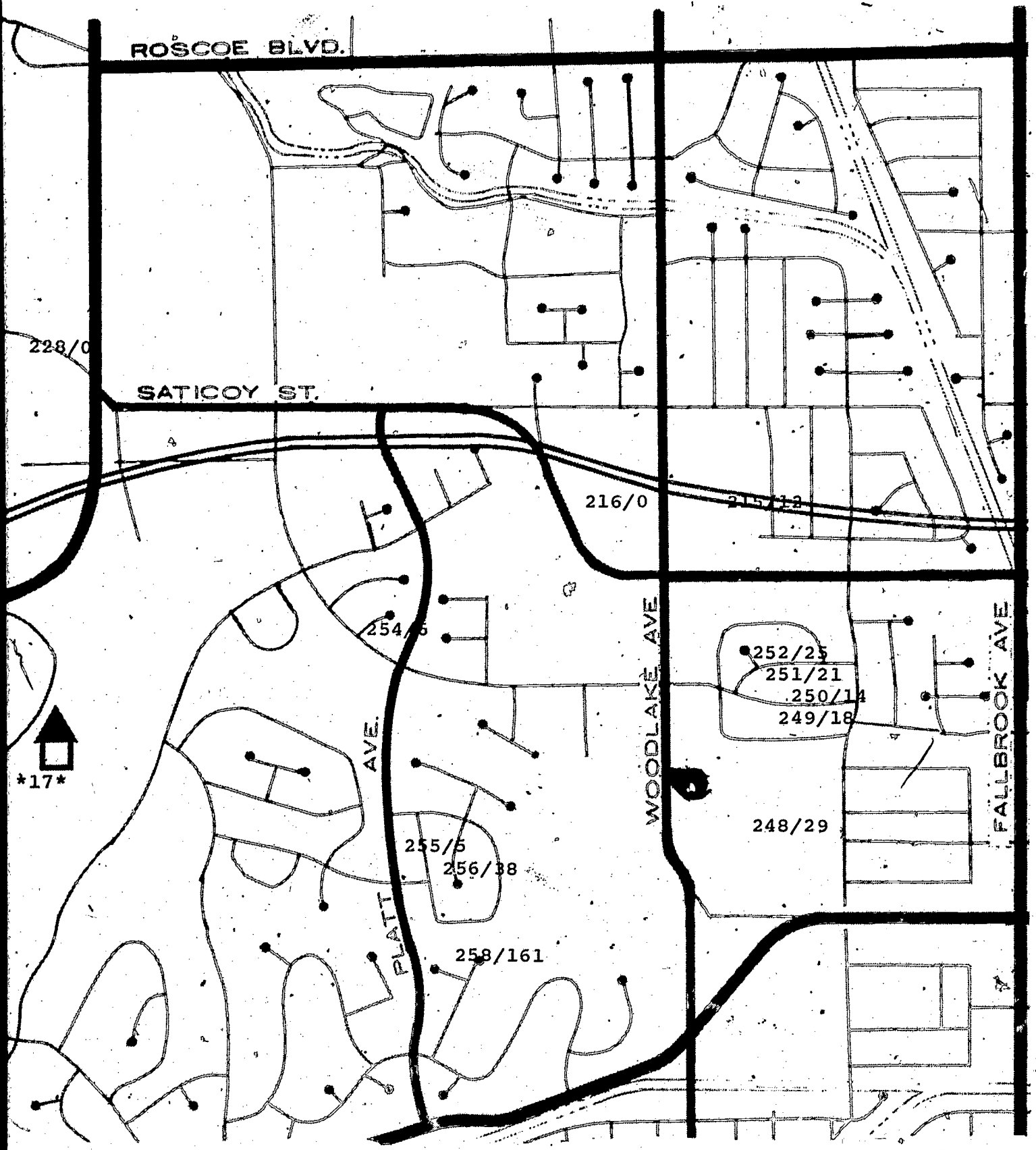

ROSCOE BLVD
SATICOY ST
RIVERSIDE DR
VANOWEN ST
VICTORY BLVD
BURBANK
ORNARD ST
VENTURA FWY
VENTURA BLVD
WOODLAND HILLS
MULHOLLAND SCENIC HIGHWAY

PLOT 2.

MAP OF TRANSPORTATION REQUIREMENTS

This plot is of the planning units assigned to Pomelo (17) that are greater than 1.0 miles from the school. The plot displays the planning unit number and the number of students. This output is particularly useful in planning bus routes.


ROSCOE BLVD.
230/0
228/0
SATICOY ST.
BLVD
17
VALLEY CIRCLE
AVE.

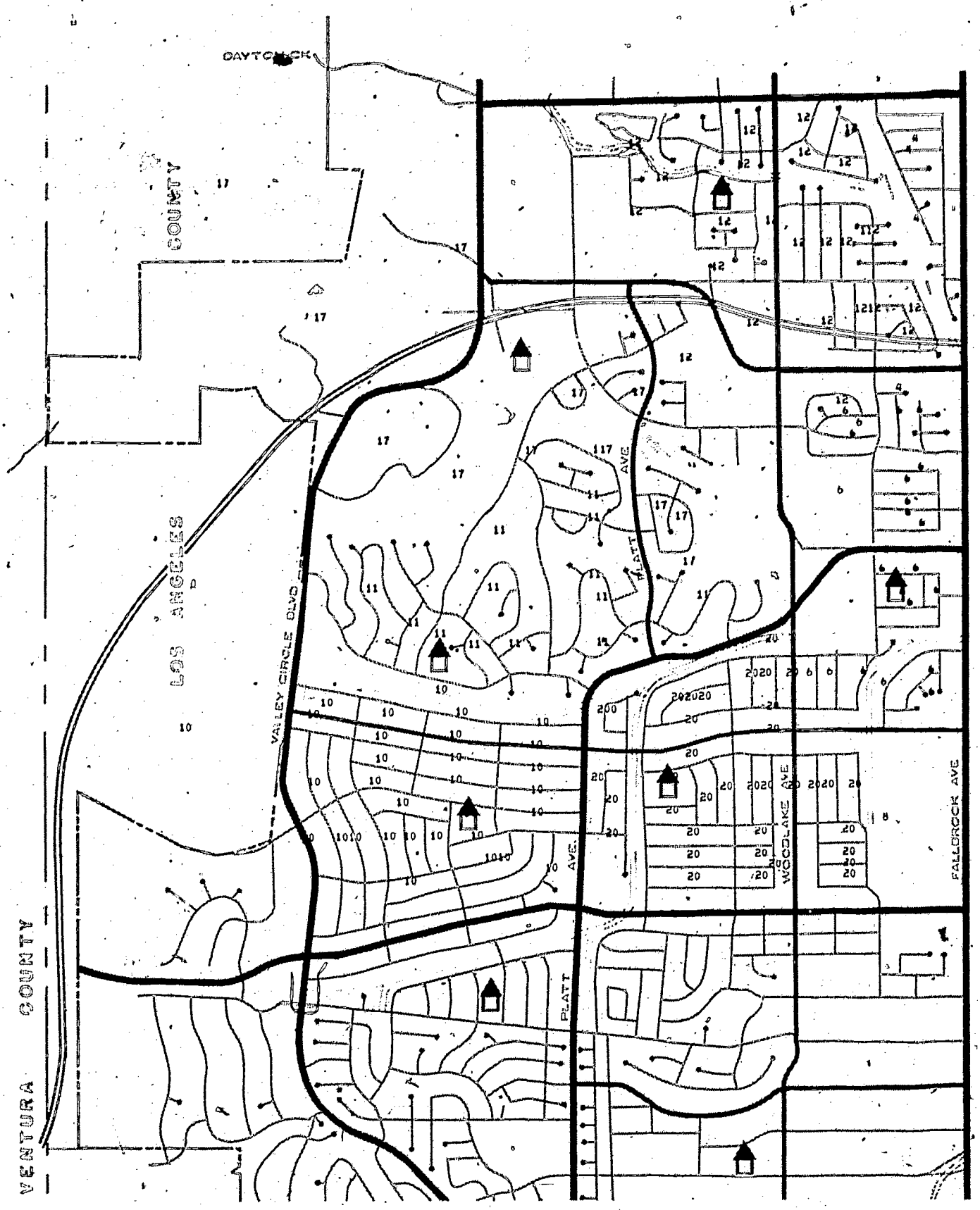

ROSCOE BLVD.
228/0
SATICOY ST.
216/0
215/13
254/6
252/25
251/21
250/14
249/18
WOODLAKE AVE
FALLBROOK AVE
AVE.
17
248/29
255/5
256/38
PLATT
258/161

PLOT 3

MAP OF ASSIGNMENTS

(NORTHWEST PORTION OF SCHOOL DISTRICT)

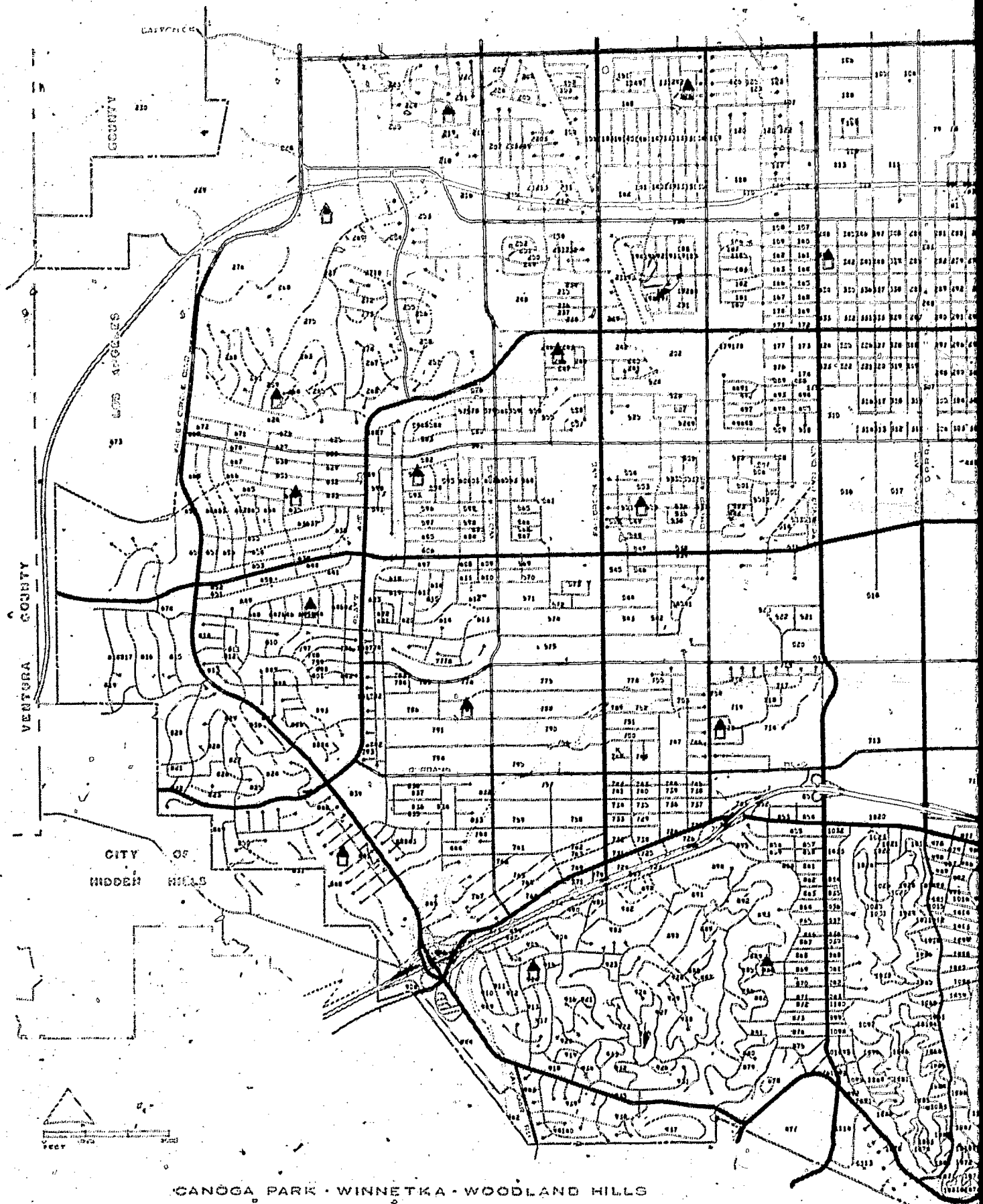
This plot of school attendance areas was generated for only the northwest portion of the school district by using the WINDOW parameter in the MAP command. The WINDOW parameters indicate the rectangle on the surface of the map that is to be plotted.

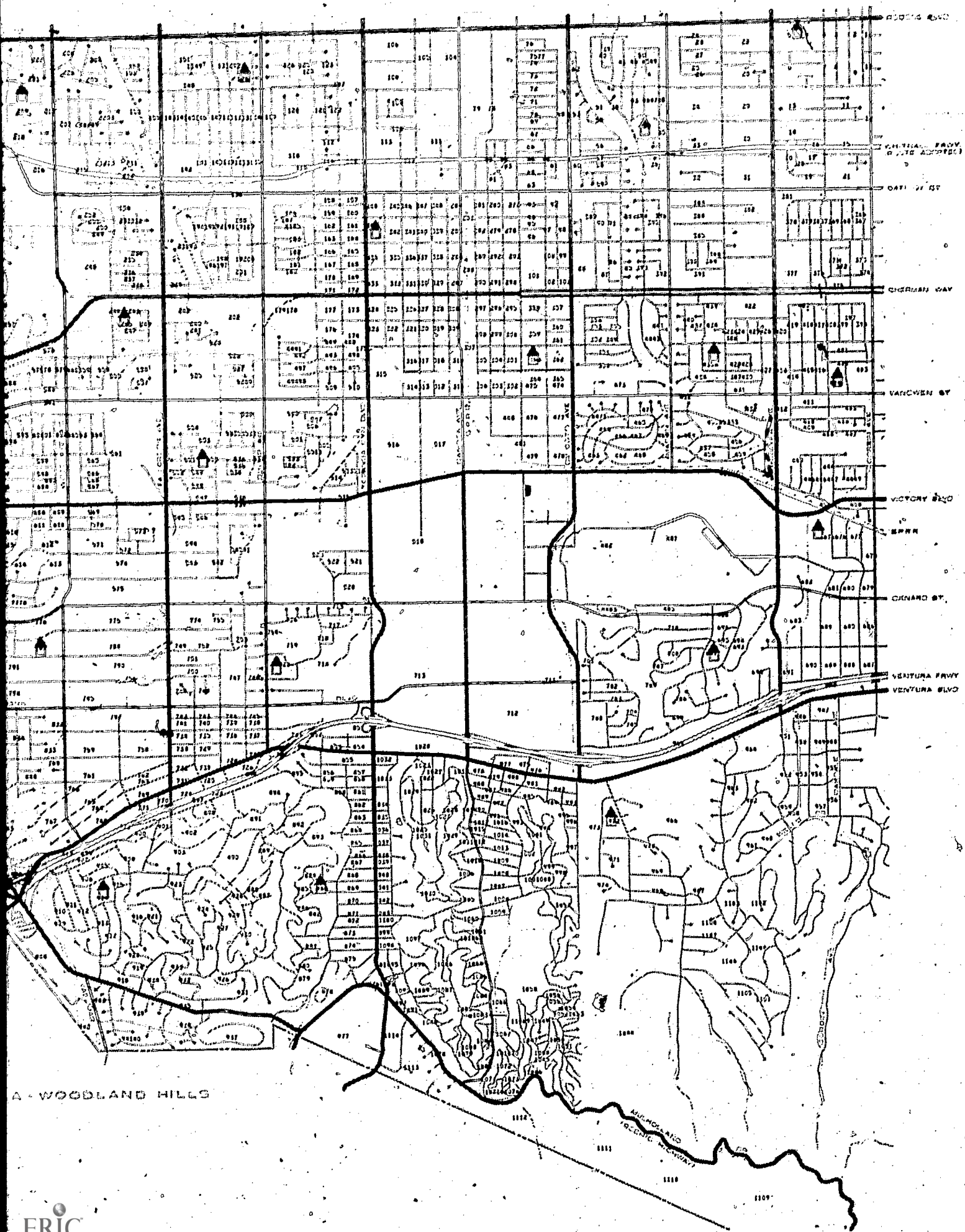

VENTURA COUNTY
LOS ANGELES COUNTY
VALLEY CIRCLE BLVD
PLATT AVE.
WOODLAKE AVE
FALLBROOK AVE

PLOT 4

MAP OF AREAS

This plot identifies the location of the planning units. Each unit is assigned a unique number which the planner uses for reference during the planning process.


VENTURA COUNTY
CITY OF
HIDDEN HILLS
CANOGA PARK · WINNETKA · WOODLAND HILLS


VICTORY BLVD
CANOGA ST.
VENTURA FWY
VENTURA BLVD
A - WOODLAND HILLS